Data Mining For More Efficient Parking And Transit

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This talk will focus on

- Parking and Transit data streams
- Challenges associated with interpreting those data
- Successes we have achieved

To meet our goal of making Parking and Transit at Texas A&M a pleasurable experience
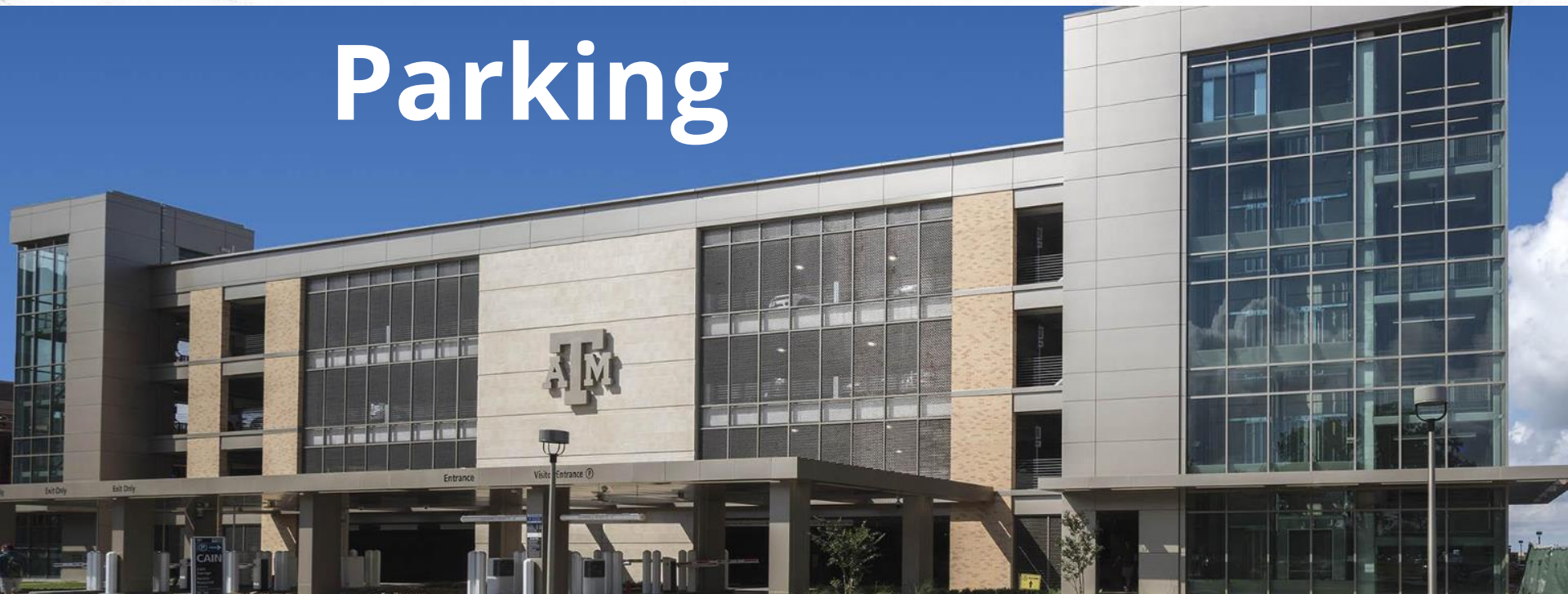
Parking

Parking

Parking

Parking

Garages

- Parking spaces
  - Reserved
  - Available
  - Total
- Entry
  - Date & Time
  - Location (lane)
- Exit
  - Date & Time
  - Location (lane)
- Duration of stay

- Payment
  - Method
  - Card type (NO NUMBERS!)
  - Location (pay station)
  - Date & Time
  - Processing time
- Time between payment and exit
- Account (if hangtag was used)

Parking

Citations

- Vehicle
  - Year, Make, Model
  - License Plate
- Date & Time
- Location
  - Lot
  - GPS
- Violation
- Issuing Officer
- Picture
- You (from vehicle info)

- Appeal
- Payment
  - Method
  - Card type (NO NUMBERS!)
  - Location
  - Date & Time

Parking

Data Mining

- Garages & Surface Lots
  - Occupancy (Hourly → Yearly → Lifetime)
  - Identify trends
  - Adjust parking rates
  - Estimate maintenance costs
  - Estimate maintenance frequency

- Citations
  - Identify trends
  - Identify problem
    - Locations
    - Lots
    - Vehicles
  - Adjust fines

Parking

Challenge: Student Government said there should be no citations during move-in because freshmen were getting a disproportionate number of citations. Mine data for citations for month of August, by class year.
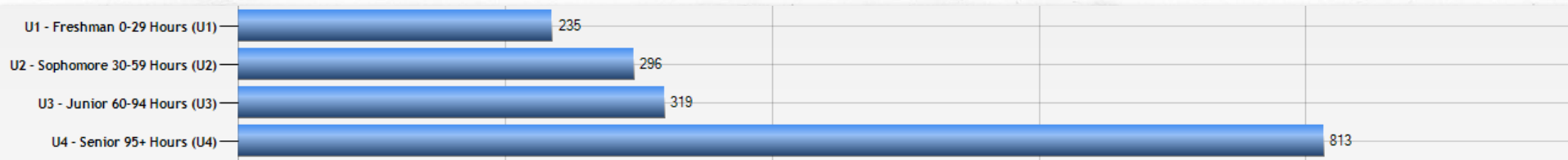
Parking

Challenge: Student Government said there should be no citations during move-in because freshmen were getting a disproportionate number of citations. Mine data for citations for month of August, by class year.

Class Year	Citations
U1 - Freshman 0-29 Hours (U1)	235
U2 - Sophomore 30-59 Hours (U2)	296
U3 - Junior 60-94 Hours (U3)	319
U4 - Senior 95+ Hours (U4)	813

Parking

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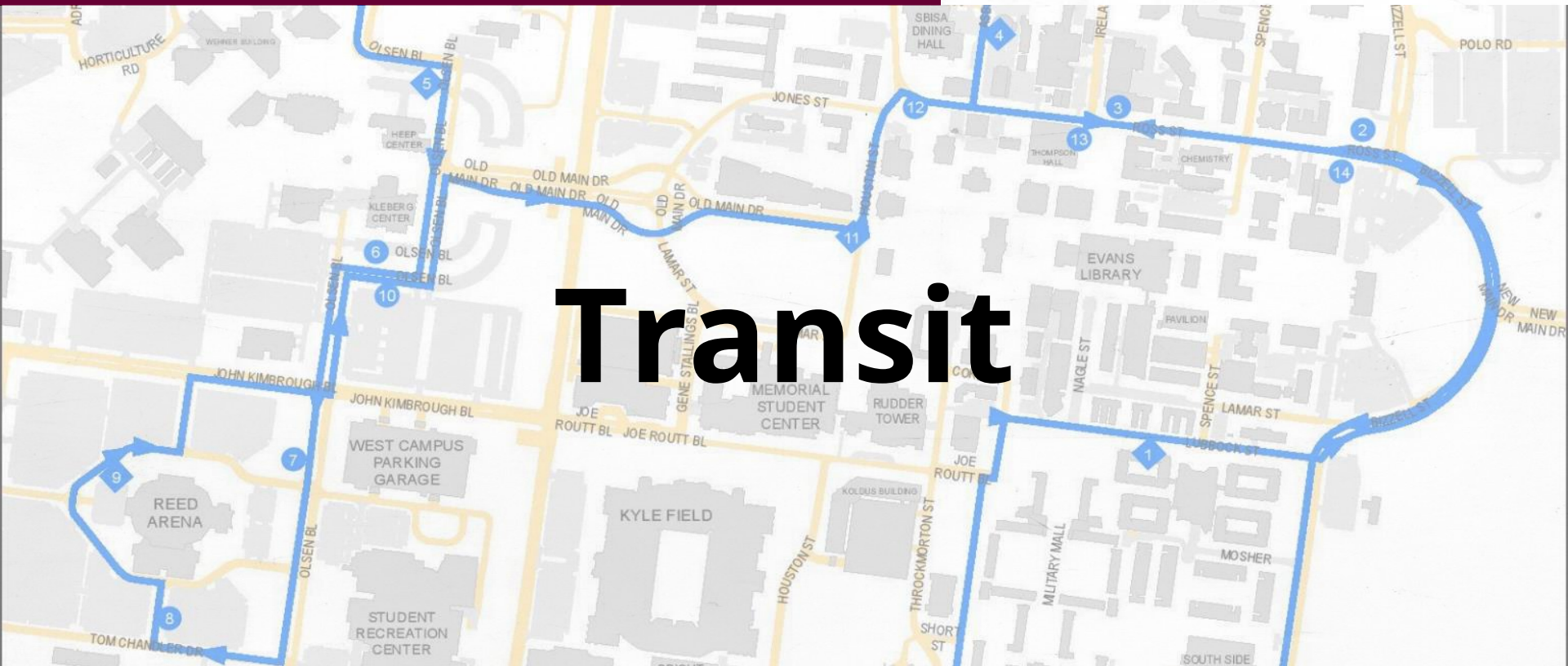
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Success: Determined freshmen actually had lowest citation rate and seniors had highest!

Transit

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Transit

Transit

Bus

- Speed
- Location
- Direction
- Route
- Capacity
- Passenger count
- ETA to next stop
- Route Schedule Adherence (RSA)
- and more

Route

- Name
- Pattern
- Stops
- Trips
- Icon
- ID

Transit

Stop

- Name
- Boarding
- Alighting
- ETA for next bus
- Location
- Type (Timed/Waypoint)
- ID

Pattern

- Location array
- Effective dates

Transit

Bus Routes Website

- Page Views (hits)
- Real-time
  - Active users (per second/minute)
  - Top active pages
  - Top referrals
- Acquisition
- and more Google Analytics

Transit

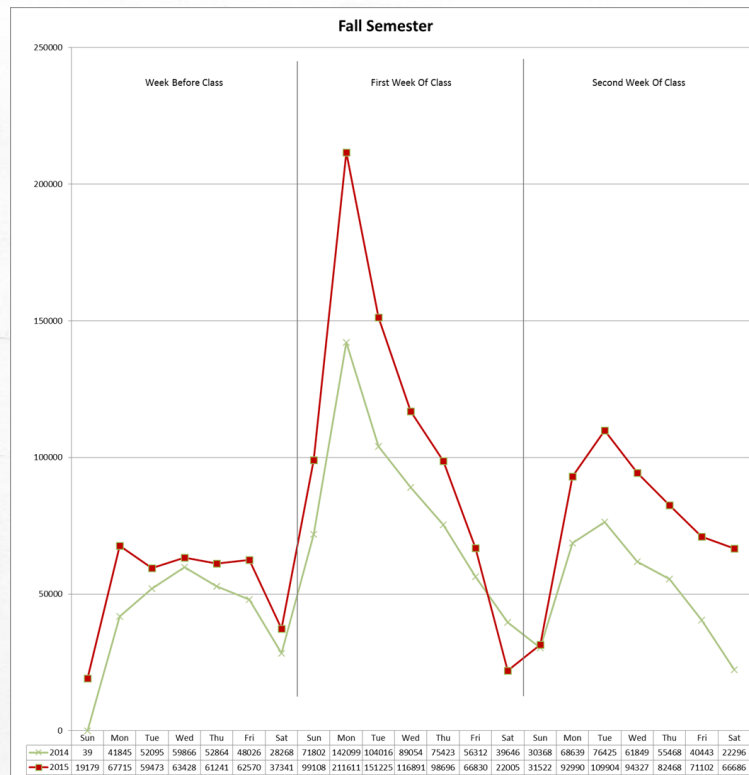Challenges
&
Successes

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Transit

Challenge:

How do we know the bus routes website is meeting user needs?

Transit

Success:

Data mining page views across the first week of class shows dramatic increase in usage.

Fall Semester

Week Before Class | First Week Of Class | Second Week Of Class

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
2014	39	41845	52095	59866	52864	48026	28268	71802	142099	104016	89054	75423	56312	39646	30368	68639	76425	61849	55468	40443	22296
2015	19179	67715	59473	63428	61241	62570	37341	99108	211611	151225	116891	98696	66830	22005	31522	92990	109904	94327	82468	71102	66686

Transit

Challenge: How many buses do we need to put on a route?

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Transportation Services

Challenge: How many buses do we need to put on a route?

Success: Data mine ridership on each route to determine most in demand routes, and allocate more buses.

Challenge: How do we know our bus stops are in a good location?

Transit

Challenge: How do we know our bus stops are in a good location?

Success: Data mine boarding and alighting counts for each bus stop to determine effectiveness of each bus stop, and adjust bus stops.

Transit

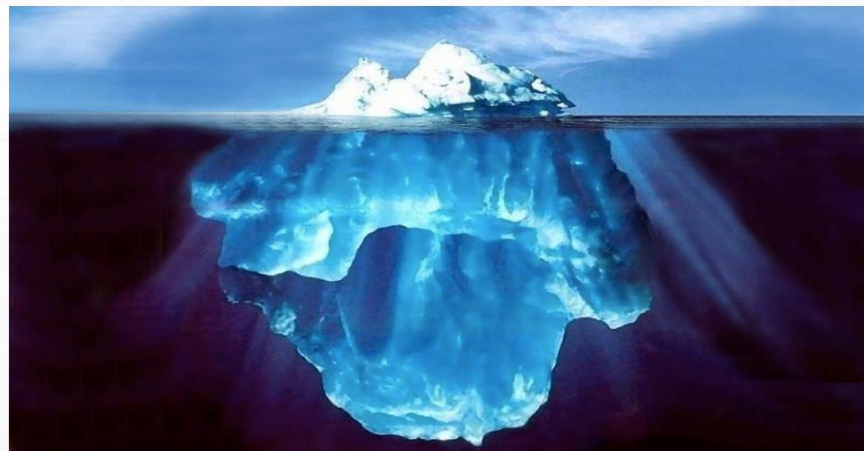Challenge: How do we know off campus students have easy access to a bus route?

Transit

Challenge: How do we know off campus students have easy access to a bus route?

Success: Data mine student addresses, then geolocate, heat map, and overlay with bus routes, to determine effectiveness of bus routes coverage
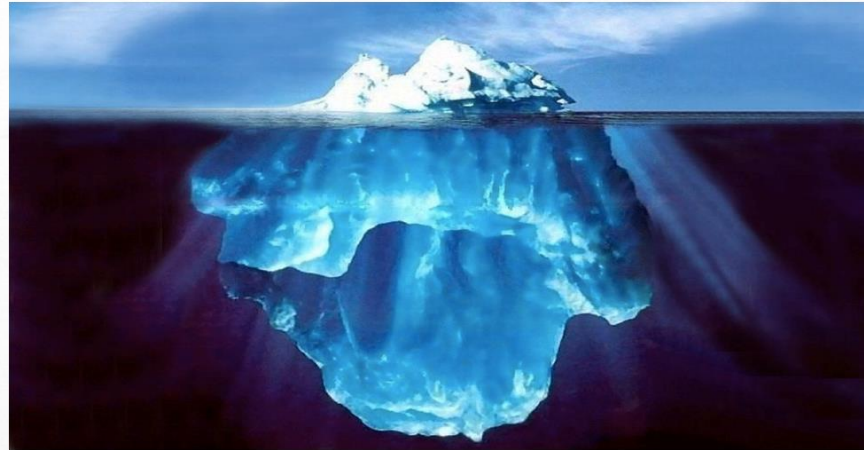
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Transportation Services

Legend

Bus Routes

Density per Acre

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 16
- 16 - 32
- 32 - 50
- 50 - 84

Just The Tip Of The Iceberg